

PCT

WORLD INTELLECTUAL PRO
International



INTERNATIONAL APPLICATION PUBLISHED UNDER

(51) International Patent Classification ⁶ :

E04G 9/02

A1

(11) :

WO 9605388A1

(43) International Publication Date: 22 February 1996 (22.02.96)

(21) International Application Number: PCT/AU95/00516

(22) International Filing Date: 17 August 1995 (17.08.95)

(30) Priority Data:

PM 7522	16 August 1994 (16.08.94)	AU
72963/94	13 September 1994 (13.09.94)	AU
PN 4266	19 July 1995 (19.07.95)	AU

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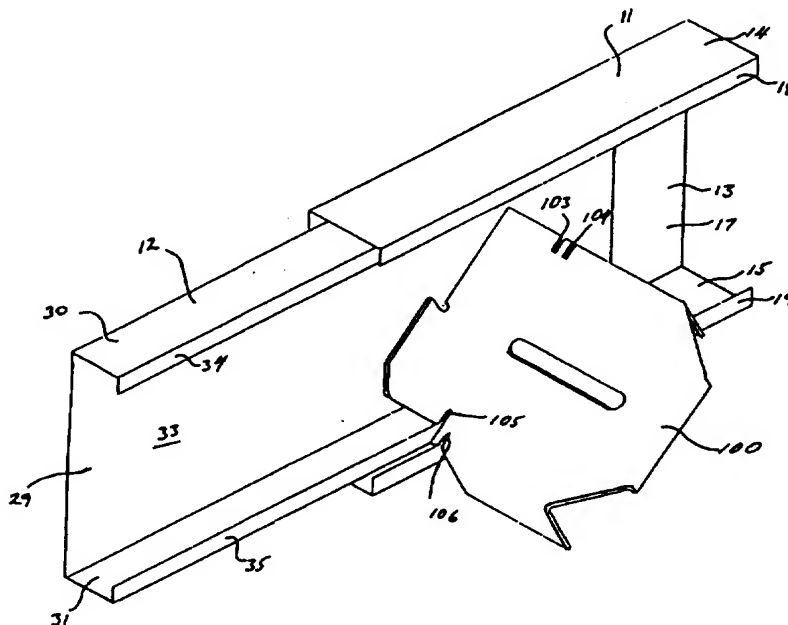
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(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).

Published

With international search report.

(54) Title: AN ADJUSTABLE BOXING ASSEMBLY



(57) Abstract

An adjustable boxing assembly including a thin-walled form member (11), having an outer face (16), of web (13), which constitutes a form surface against which concrete may be placed, and a further form member (12), having an outer form surface (32), of web (29), against which concrete may be placed, the outer form surface (32) being engageable behind the web (13) and maintained in such an operable attitude by clamping means (100) such that the two form surfaces are substantially co-extensive.

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AN ADJUSTABLE BOXING ASSEMBLY

This invention relates to an adjustable boxing assembly.

This invention has particular but not exclusive application to an adjustable boxing assembly for supporting wet concrete or cement, and for illustrative purposes reference will be made to such application. However, it is to be understood that this invention could be used in other applications, such as a demountable curb or a demountable barrier, ie. a wall or a fence.

Wet cement and/or concrete is often used to construct various structures including slab like foundations upon which buildings may be built as well as curbing and edging. The boundaries of the intended structures are usually defined by a plurality of upstanding walls, often referred to as boxing, and wherein the walls are used to support the wet concrete or cement. The upstanding walls typically comprise one or more timber forms arranged end to end and wherein the timber forms are preferably supported by a plurality of bracing members, such as a plurality of wooden pegs driven into the ground directly behind said timber forms.

Unfortunately, the construction of boxing, including measuring and cutting lengths of timber is often very time consuming and wherein the resulting offcuts are in many instances discarded, being too short to be used as timber forms. In addition, it has been observed that timber forms have a tendency to warp due to the absorption of moisture during use and that timber which is warped may be unsuitable for future use in the construction of boxing and/or may require additional bracing in order to provide a reasonably straight and/or planar form surface. It is also been noted that timber pegs used as bracing members have a tendency to split as a consequence of repeated use.

The present invention aims to alleviate one or more of the above disadvantages and to provide an adjustable boxing assembly which will be reliable and efficient in use.

With the foregoing in view, this invention in one aspect resides broadly in an adjustable boxing assembly including:-

5 a thin walled form member having an outer face which constitutes a form surface against which concrete may be placed;

a further form member having an outer form surface against which concrete may be placed and being engageable behind said outer face, and

10 engaging means for engaging said further form member and said thin walled form member together in an operative attitude.

Preferably said thin walled form member includes an inner face and wherein said further form member is engageable against said inner face such that said engaged form members
15 provide a substantially contiguous form surface.

The thin walled form member may be constructed from a variety of materials including wood, plastics, fibre glass or metal and may be of rigid or flexible construction. For example, in one embodiment the thin walled form member may
20 comprise a strip of material which may be used as a form surface wall.

In alternative embodiments, in addition to a form surface wall, the thin walled form member may also include one or more walls or flanges extending outwardly from said
25 form surface wall. For example, the thin walled form member may include lateral and/or vertical restraining walls which may be utilised as abutments against which the further form member may abut and/or as a stop cooperable with the engaging means.

30 Preferably the thin walled form member is lipped channel shaped and includes a form surface wall, a lateral abutment or return flange extending upwardly from a lower wall which extends outwardly from said form surface wall and an upper wall or flange which extends outwardly from said form surface
35 wall in the direction of the lateral abutment. It is also preferred that there is provided a significant clearance

between the further form member and the thin walled form member in order to readily facilitate the separation of said form members.

The thin walled form member may also include foundation engaging means associated therewith for maintaining the position of said form member relative to a foundation such as the ground upon which said form member rests. For example, In one embodiment, the foundation engaging means may comprise one or more pointed projections extending below a base of the thin walled form member and which may be inserted into the foundation.

In an alternative embodiment, the foundation engaging means may include one or more foundation engaging members, such as a plurality of pegs, each of which may be driven into the foundation, and wherein the foundation engaging members may each extend through or otherwise engage or abut the aforementioned thin walled form member.

In addition, the foundation engaging means may be supported by bracing means such as a bracing member and wherein one end of the bracing member may be adapted for engagement with the surrounding foundation. For example a peg, which extends through a lower end of the bracing member, may be used to secure the bracing member to the foundation.

The further form member may also be constructed from a variety of materials including wood, plastics, fibre glass or metal and may be of rigid or flexible construction.

Furthermore, the further form member may be of any suitable configuration which permits the operative engagement of the further form member behind the thin walled form member such that the form surfaces of the two form members are substantially co-extensive, i.e. that they form a substantially continuous form surface. For example, the further form member may comprise an elongate length of timber which may be much thicker than the thickness of the thin walled form member. Alternatively, the further form member may comprise a thin walled length of extruded or roll formed metal section.

Where the thin walled form member includes lateral and vertical restraining walls, it is preferred that the further form member be locatable and/or slidably received within the confines of thin walled form member. Furthermore, it is preferred that a significant clearance is provided between the two engaged form members so as to readily facilitate the separation of the two form members.

The further form member may also include foundation engaging means associated therewith for maintaining the position of the form member relative to the foundation. In one embodiment, the foundation engaging means may comprise one or more projections extending below a base of the further form member and which may be inserted into the foundation.

In an alternative embodiment, the foundation engaging means may include one or more foundation engaging members, such as a plurality of pegs, each of which may be driven into the foundation and wherein the foundation engaging members may each extend through, abut or otherwise engage the further form member.

The foundation engaging means may be supported by bracing means such as a bracing member and wherein one end of the bracing member may be adapted for engagement with a surrounding foundation. Furthermore a peg, which extends through a lower end of the bracing member, may be used to secure the bracing member to the foundation.

In one embodiment, the engaging means may include releasable fasteners which may co-operate with selected apertures formed in the walls of the thin walled form member and/or the further form member. For example a plurality of nuts and bolts may be used to releasably secure the two form members together.

Alternatively, the thin walled form member may be provided with a plurality of threaded studs which each extend outwardly from a laterally orientated upper wall or a vertically orientated side wall of the form member. The studs may also extend through aligned apertures, such as

slotted apertures, formed in an abutting wall of the further form member and wherein nuts may be used to secure the form members together.

5 In yet another embodiment the engaging means may comprise a clamp or a plurality of clamps used to clamp the two form members together.

10 In yet another embodiment the engaging means may comprise a wedge or a plurality of wedges, each of which may be adapted to provide restraint in a vertical direction, a horizontal direction or in both directions, and which may be used to operatively urge the two form members together. For example, the two form members may be maintained in an operative attitude by a pair of wedges, namely a lower wedge and an upper wedge. The lower wedge may be used to apply 15 both vertical and lateral restraint to the further form member such that an upper portion of the further form member is pressed against an upper wall of the thin walled form member whilst the upper wedge may be used to apply additional lateral restraint to the further form member. The wedges may be made from any suitable material including metal, wood or 20 plastics materials. Preferably the wedges are manufactured from a high density polyethylene material.

25 In yet another embodiment the engaging means may comprise a lever which may be positioned between the two form members and subsequently used to urge them operatively together. For example, the lever may comprise a bar of spring steel having an inclined end portion which may be positioned between the lower wall of the thin walled form member and the lower wall of the further form member such 30 that a portion of the bar intermediate it's ends abuts against the lateral abutment of the thin walled form member and wherein the lateral abutment may serve as a fulcrum for the lever. The lever may be maintained in an operative position by locking means which may also be adapted to 35 provide some lateral restraint against any undue movement of the further form member relative to the thin walled form

member. For example, the locking means may comprise a bracing member, one end of which is adapted to engage the foundation, and wherein the opposing end may be adapted to engage a portion of the thin walled form member or the further form member. The bracing member may further include an intermediate portion which is adapted to releasably engage the lever such as a plurality of notches formed along an edge thereof.

In yet another embodiment the engaging means may comprise a connecting member which is adapted to engage both form members such that the form surfaces provide a substantially continuous form surface. The connecting member may include a mounting portion adapted to engage either one or both form members to be supported thereby. For example, the mounting portion may include a plurality of slotted recesses each adapted to receive a respective portion of one or the other form member. In another embodiment, the mounting portion may include one or more projections which are each adapted to engage a corresponding aperture or recess formed in one or the other of the two form members.

The connecting member may also include foundation engaging means such as foundation engaging means of the general type described above with respect to the form members. However, preferably the connecting member is provided with securing means for securing the connecting member to foundation engaging means such as a peg, which may have a round or rectangular transverse cross-section. The securing means may be connectable to the connecting member and may include a hook like end portion adapted to engage an intermediate portion of an adjacent foundation engaging means. For example, the securing means may comprise a piece of bar stock having a threaded stem adapted to engage a threaded aperture formed in the connecting member. Alternatively, the securing means may extend through a slotted aperture formed in the connecting member and may be maintained in place by a suitable fastener such as nut or a

pin.

The connecting member may also include anti-rotational means adapted to resist rotation of the connecting member relative to the ground engaging member. For example, the
5 connecting member may include one or more edges which are adapted to frictionally engage, or bite into, the foundation engaging means upon application of the connection means.

The connecting member may also include anti-rotational means adapted to resist rotation of the form member relative
10 to the connecting member. For example, the connecting member may include one or more flanges which abut against a surface of the form member and thereby resist rotation of the form member relative to the connecting member.

In another aspect, this invention relates to positioning
15 means for maintaining an upper form member in a desired spaced relationship relative to a lower form member including:

spacing means;

20 locating means for locating said spacing means in a fixed position relative to the lower form member, and

supporting means connected to said spacing means for supporting the upper form member. Preferably, the configuration of said supporting means is such that the upper
25 form member rests upon said support means and wherein there is also provided selectively engageable retaining means for retaining the upper form member in operative engagement with said support means.

The positioning means may be constructed from any suitable material including metal, wood or plastics materials.

30 The spacing means may comprise a frame member or a plurality of frame members. Furthermore the spacing means may be adjustable, namely the distance separating the locating means and the support means may be selectively variable. For example, the spacing means may comprise a plurality of
35 telescopic frame members and wherein there may be provided locking means for retaining the frame members in a preferred

relationship.

The locating means may be located at one end of the spacing means and may comprise a pair of form engaging portions, each form engaging portion comprising at least one surface or edge which is adapted to engage a respective opposing portion of the lower form member. The form engaging portions may be maintained in a fixed relationship by an intermediate member. Alternatively, the distance separating the form engaging portions may be adjustable.

10 Alternatively, the locating means may include an end portion of the spacing means and mounting means associated with the lower form member or any bracing supporting the lower form member, including any engaging means used to connect the lower form member to an adjacent form member,
15 and whereby, in use, said end portion may be secured to or supported on said lower form member or said bracing by said mounting means. For example, the spacing means may include an end portion having a square shaped transverse cross-section which is locatable within a complementary shaped, vertically
20 aligned, socket formed in or attached to the lower form member and/or bracing.

Preferably, the locating means includes fastening means for ~~fastening the positioning means to the lower form member~~
and/or bracing. For example, the locating means may include
25 one or more toothed or spike like projections which may be embedded into a wooden form member, or a threaded stem which may be secured to a lower form member using a
~~threaded fastener~~ such as a nut.

Preferably, the lower form member is connected to an
30 abutting form member by a connecting member, as described above, and the connecting member includes a horizontally disposed sleeve like mounting adapted to receive the aforementioned end portion and locking means, such as a grub screw, for retaining said end portion in said sleeve. However,
35 a clamp, or one or more threaded fasteners may have been used to connect the positioning means to the connecting

member.

The supporting means is spaced from the locating means by the spacing means and in a preferred embodiment is located at an opposite end thereof. The supporting means may include an abutment upon which an upper form member may rest such as a flange having a form support surface which may abut an adjacent surface of a form member.

In addition, the support means may include restraining means, such as a further abutment, which in use is intended to curb or repress any tendency the upper form member may have to rotate due to forces applied thereto by the concrete or cement supported by said upper form member.

The retaining means is preferably adapted to retain the upper form member on the positioning means. In one embodiment, the retaining means may comprise a portion of the support means which is adapted to releasably engage an adjacent portion of the form member. For example, the form member may be constructed from a thin walled member and may include a return flange associated with one edge thereof and wherein the return flange is adapted to engage a flange of the supporting means.

Alternatively, the retaining means may include a member which is tethered to, or by some other means is connected to, the positioning means and wherein the retaining means is adapted to selectively engage the upper form member supported by said positioning means. For example, the retaining means may comprise a member, such as a spring loaded detent or pin, which when extended engages a portion of the form member.

In yet another embodiment, the retaining means may include a hook like member having a distal end which is adapted to selectively engage a distal edge or surface of the form member.

In another aspect this invention relates to an adjustable boxing assembly including:-

- a lower form member;
- an upper boxing assembly comprising at least two form

members, the position of said form members relative to one another being adjustable, and

positioning means for maintaining said upper boxing assembly in a desired spaced relationship relative to said lower form member.

Preferably the positioning means is as described above.

The upper boxing assembly may comprise at least two form members and wherein at least one of the form members is permitted to slide within the other.

10 Preferably there is provided a significant clearance between the further form member and the thin walled form member to facilitate disengagement of the form members from one another. Accordingly, one form member may be dimensionally smaller than the other and wherein there may
15 also be provided urging means for urging the smaller form member against the larger form member such that the surfaces of the respective form members which are intended to provide support for wet concrete or cement form a substantially continuous wall. For example, the upper boxing assembly may
20 comprise a thin walled form member, having an outer face which constitutes a form surface against which concrete may be placed, and a second form member having an outer form surface against which concrete may be placed, said outer form surface being engageable behind said outer face and maintained
25 in an operatively engaged position by the supporting means and/or retaining means of the positioning means.

The form members may each include a rearwardly displaced, upturned edge, which in use may inhibit the displacement of substantial amounts of wet concrete or cement
30 between the two form members. In addition, plugs may be provided which are adapted to close any gaps which exist between the lower surfaces of the two form members.

The thin walled form member may be constructed from a variety of materials including wood, plastics, fibre glass or
35 metal.

The thin walled form member may comprise levelling

means such as a line scribed along the length of the form surface or indicia printed thereon. Alternatively the leveling means may include an upper edge or upper surface which may be used to support a trowel or the like.

5 In one embodiment the thin walled form member may be a rigid or flexible, elongate sheet of material such as a thin, elongate, rectangularly shaped sheet of stainless steel. Alternatively, the thin walled form member may include a form surface wall and one or more walls or flanges extending
10 outwardly therefrom and wherein the transverse cross-sectional shape of the form member may be constant along its' length. For example, the thin walled form member may be a length of roll formed steel having an "L" shaped transverse cross-section.

The further form member may also be constructed from a
15 variety of materials including wood, plastics, fibre glass or metal.

The further form member may be of any suitable configuration which permits the operative engagement of the two form members such that the form surfaces of the two form
20 members form a substantially continuous side wall. For example, the further form member may comprise an elongate piece of timber or sheet metal. In yet another embodiment, the further form member may comprise an extruded or roll formed section.

25 The further form member may comprise leveling means such as a line scribed along the length of the form face or indicia printed thereon. Alternatively the leveling means may include an upper edge or upper surface which may be used to support a trowel or the like.

30 The upper boxing assembly may also include clamping means for operatively clamping the two form members together. For example, the clamping means may comprise a clamping member which is adapted to engage both form members and which when rotated clamps the two form members together
35 such that the form surfaces provide a substantially continuous

formsurface. Alternatively, the form members may be retained in operative engagement by a plurality of fasteners such as a plurality of threaded fasteners.

In another aspect this invention relates to a form member support assembly for operatively supporting a form member, said form member support assembly including:

foundation engaging means, and

mounting means for mounting a form member thereto.

Preferably, there is provided releasable connection means associated with said mounting means for connecting said mounting means to the foundation engaging means. Preferably the connection provided by the connection means is adjustable whereby the position of the form member relative to a position on the foundation such as the ground may be adjusted in a vertical direction and/or a horizontal direction.

The mounting means may include a mounting member which may be any suitable shape. For example, the mounting member may be of plate like construction and may be formed from a piece of sheet metal.

The mounting means may include one or more faces and wherein a form member may be attached to the face or faces using a variety of mechanical fasteners such as nails or screws. For example, the mounting means may comprise a mounting flange having at least one aperture formed therein through which the threaded stem of a bolt or the like may extend.

Alternatively, the mounting means may be adapted to engage the form member to be supported thereby and by way of example may include one or more recesses or apertures each adapted to receive a portion of the form member. In another embodiment, the mounting means may include one or more projections which are each adapted to engage a corresponding aperture or recess pertaining to the form member.

The foundation engaging means may comprise a foundation engaging member such as a peg, which may have a round or rectangular transverse cross-section, and wherein the

connection means may include a sleeve through which the foundation engaging member may extend. Alternatively, the connection means may be adapted to engage a portion of the peg. For example, the connection means may include a 5 connecting member which is connectable to the mounting means and which includes a hook like end portion adapted to engage an intermediate portion of the peg.

In one embodiment, the connecting member may be threaded and may be adapted to engage a threaded aperture 10 formed in the mounting member. Alternatively, the connecting member may extend through a slotted aperture formed in the mounting member and may be maintained in place by a suitable fastener such as nut or a pin.

The mounting means may also include engagement means 15 adapted to resist rotation of the mounting means relative to the ground engaging member. For example, the mounting member may include one or more edges which are adapted to frictionally engage, or bite into, the ground engaging member upon application of the connection means.

20 The mounting means may also include engagement means adapted to resist rotation of the form member relative to the mounting means. For example, the mounting member may include one or more flanges which abut against a surface of the form member and thereby resist rotation of the form 25 member relative to the support member.

In yet another aspect this invention relates to a method of erecting an adjustable boxing assembly including:

providing a thin walled form member having an outer face which constitutes a form surface against which concrete may 30 be placed;

positioning a portion of a second form member, being a form member having an outer form surface against which concrete may be placed, behind said outer face of said thin walled form member, and

35 urging said further form member and said thin walled form member together such that said outer face and said outer

form surface form a substantially contiguous form surface. Preferably engaging means is used to clamp said form members together and wherein said engaging means provides an urging force sufficient to urge said outer form surface against said inner face so as to provide a substantially contiguous form surface.

In yet another aspect, this invention relates to a method of constructing a concrete element using wet concrete, said method including:

- 10 constructing a boundary against which the wet concrete may be placed comprising a boxing assembly of the type described above;

pouring wet concrete against said boxing assembly, and removing said boxing assembly once no longer required to 15 support the concrete.

In order that this invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a typical embodiment of the invention and wherein:-

- 20 FIG. 1 is a rear perspective view of an adjustable boxing assembly constructed in accordance with the present invention;

FIG. 2 is another rear perspective view of the adjustable boxing assembly illustrated in figure 1;

- 25 FIG. 3 is a detailed perspective view of a hinged connection connecting two adjacent form members which is constructed in accordance with the present invention;

FIG. 4 is a rear perspective view of corner connection of the adjustable boxing assembly;

- 30 FIG. 5 is a rear perspective view of another corner connection of the adjustable boxing assembly.

FIG. 6 is a perspective view of an adjustable boxing assembly which is similar to the assembly illustrated in figure 1 but which employs a different method of urging

- 35 the two form members together;

FIG. 7 is another rear perspective view of the boxing

assembly illustrated in figure 6;

FIG. 8 is yet another rear perspective view of the boxing assembly illustrated in figure 6;

FIG. 9 is a side view of a lever;

5 FIG. 10 is a perspective view of a boxing assembly constructed in accordance with the present invention comprising a pair of form members which are operatively clamped together by alternative engaging means;

10 FIG. 11 is a front view of the engaging means illustrated in figure 10;

FIG. 12 is an end view of the engaging means illustrated in figure 10;

FIG. 13 is a plan view of the engaging means illustrated in figure 10;

15 FIGS. 14 and 15 are plan views of the engaging means illustrated in figure 10;

FIG 16 is a perspective view of the engaging means illustrated in figure 10;

20 FIG. 17 is a perspective view of positioning means for maintaining an upper form member in a desired spaced relationship relative to a lower form member;

FIG. 18 is a side view of an upper boxing assembly supported by the positioning means illustrated in figure 17;

25 FIG. 19 is a perspective view of the upper boxing assembly illustrated in figure 18;

FIG. 20 is a side view of the upper boxing assembly illustrated in figure 18;

30 FIG. 21 is a rear perspective view of an adjustable lower boxing assembly constructed in accordance with the present invention;

FIG. 22 is another rear perspective view of the boxing assembly illustrated in figure 21;

35 FIG. 23 is another rear perspective view of the boxing assembly illustrated in figure 22 with the addition of positioning means for connecting thereto an upper boxing

assembly, and

FIG. 24 is a rear perspective view of an upper boxing assembly spaced from and supported on the lower boxing assembly illustrated in figure 21.

5 Figures 1 and 2 illustrate an adjustable boxing assembly 10, which may be used to construct a continuous side wall contained substantially in the one plane, comprising a thin walled form member 11 and a further form member 12 slidably received therein.

10 The thin walled form member 11 comprises a length of roll formed lipped channel section of stainless steel and includes a vertically orientated web 13 separating an upper, horizontally orientated, wall 14 and a lower, horizontally orientated, wall 15. The web 13 includes an outer face 16
15 which constitutes a form surface against which concrete may be placed and an inner face 17.

The upper and lower walls 14 and 15 each extend outwardly from the inner face 17 and each include a respective return flange or lip 18 and 19.

20 In order to secure the thin walled form member 11 to a foundation, such as the ground on which the member stands, the form member 11 is provided with a plurality of vertically orientated tubular members 20 which are each affixed to the lips 18 and 19 of the form member and wherein each tubular
25 member is adapted to receive a respective peg 21, which when driven into the ground also extends there through.

In addition to the support provided by the pegs 21, each thin walled form member 11 may also be supported by bracing means comprising an inclined bracing member 22 having an
30 upper step or flange 23 and a lower step or flange 24. The upper step 23 is provided with an open ended slot 25 which is adapted to engage the body 26 of a respective tubular member 20. The lower step 24 is adapted to abut or engage the ground and includes a mounting aperture 27 formed therein through
35 which a peg 28 may extend.

The further form member 12 also comprises a length of

roll formed lipped channel section of stainless steel and includes a vertically orientated web 29 separating an upper, horizontally orientated, wall 30 and a lower, horizontally orientated, wall 31. The web 29 includes an outer face 32 which constitutes a form surface against which concrete may be placed and an inner face 33.

The upper and lower walls 30 and 31 each extend outwardly from the inner face 33 and each include a respective return flange or lip 34 and 35.

10 It will be noted that the further form member 12 is dimensionally smaller than the thin wall walled form member 11 and that there exists significant clearance between the two form members in both the lateral and vertical directions when the two form members are operatively engaged together, as 15 illustrated in figures 1 and 2.

In this regard, engaging means comprising an upper wedge 36 and a lower wedge 37 may be used to operatively urge the two form members together such that they present a substantially continuous side wall comprising form surfaces 16 20 and 32 as illustrated in figures 1 to 3.

The lower wedge 37 is adapted to be slidably received within the channel defined by the web 13 and the opposing lip 19 and wherein the wedge 37 includes an inclined wall 38 adapted to abut against the lower wall 31 of the further form 25 member such that the upper edge of the web 29 and the upper wall 30 are forced to abut the upper wall 14.

The wedge 37 also includes a lateral abutment 50 having two opposing side walls. One side wall is adapted to abut the lip 35 and wherein the opposing side wall is adapted to abut 30 the lip 19 such that the engagement of lateral abutment 50 with lips 19 and 35 forces the webs 13 and 29 to abut.

The upper tapered wedge 36 is substantially triangular in shape and includes an inclined edge 39 and two orthogonal edges 40 and 41. The wedge 36 may be inserted in a slotted 35 aperture 38 formed in the upper wall 14 such that the orthogonal edge 40 bears against the lip 34 of the form member

12 forcing the surface 32 thereof to abut the web 13 of the thin walled form member.

In order to support the wet concrete the further form member 11, when clamped to a thin walled form member, may be secured to the foundation, such as the ground on which the thin walled form member stands, using a plurality of pegs 42 which may be driven into the ground and which each may extend through a respective open tubular housing 43 extending between opposing upper and lower walls 30 and 31.

10 In addition to the support provided by the pegs 42, each further form member 12 may also be supported by bracing means comprising an inclined bracing member which is similar to the bracing member 22 and which includes an upper step or flange and a lower step or flange. The upper step is provided 15 with an open ended slot which is adapted to engage the body of a respective tubular housing 43. The lower step is adapted to abut or engage the ground and includes a mounting aperture formed therein through which a peg may extend.

Where a first form surface is required to meet or 20 intersect a second form surface as may be the case at a corner of the boxing, a thin walled connecting member 60, as illustrated in figures 4 and 5, may be used to join two adjacent form members 12 together. The connecting member 60 is similar in construction and configuration to the thin walled 25 form member 11 and includes two orthogonal channel shaped portions 61. However it will be appreciated that in other embodiments, the included angle may vary. For example, in other embodiments the included angle may be 45°.

As an alternative to the use of rigid corner members 60, 30 an alternative corner member 65, as illustrated in figure 3, may be used. The corner member 65 comprises two adjacent thin walled form members which are hingedly connected together using a pin 66 which is threaded through eyes 67 mounted on the ends of the form members. It will be appreciated that the 35 hinge connection permits a user to selectively vary the included angle.

Figures 6 to 8 illustrate an alternative method of operatively urging together a thin walled form member 11 and a further form member 12 using a lever 75. The lever is manufactured from a bar of spring steel and includes a substantially straight handle 76 and an inclined end portion 77.

Typically the inclined end portion 77 may be positioned between the lower wall 15, separating the lateral abutment or lip 19 from the web 13, and the lower wall 31, of the further form member 12, such that an intermediate portion of the lever 10 rests upon and pivots about a fulcrum 78 comprising the upper edge 79 of the lip 19, as illustrated in figures 6 to 8. When a downwardly directed force is applied to the handle 76 the lever will urge the upper wall 30, of the further form member 12, against the upper wall 14, of the thin walled form member.

15 To assist in the location of the lever 75 on the edge 79, the lever 75 may further include locating means such as a notch formed therein or a piece of angle iron welded thereto which is adapted to receive the edge 79.

The lever 75 is preferably maintained in its operative 20 position by locking means such as a bracing member 80 comprising upper and lower horizontally disposed flanges 81 and 82 respectively, separated by an inclined web 83 having a plurality of notches 84 formed in a side edge thereof which are adapted to receive or engage the handle 76 of the lever. The 25 upper flange 81 is provided with a semi-circular notch 85 formed in a side edge thereof and may be positioned adjacent the form members such that its upper surface abuts the underside of the wall 30 whilst its leading edge abuts against the rear surface of the wall 29 and may also be employed to 30 maintain the form surfaces in operative engagement, as illustrated in figures 6 and 7.

Alternatively, the semi-circular notch 85 may releasably engage a tubular member 20 or 43 and may thus be used to either "push" or "pull" against the form members, as generally 35 illustrated in figure 8.

The lower flange 82 is provided with a mounting aperture

86 formed therein through which a ground engaging peg 28 may extend.

It will be appreciated that the boxing assembly described above may be used to quickly erect boxing or a plurality of 5form surfaces prior to pouring concrete.

In particular, a wall for supporting concrete may be constructed by arranging a plurality of alternating form members 11 and 12 end to end and wherein the length of the wall may be selectively varied by slidably altering the position 10of one or more form members 12 relative to one or more form members 11.

Having arranged the form members such that they form a wall, a plurality of pegs 21, each located in a respective tubular member 20 may be driven into the ground and/or 15bracing members 22 or 80 may be used to support each form member. The bracing members may be secured to the ground by driving a peg 28 through the mounting aperture.

To operatively clamp each of the form members 12 to a supporting form member 11, a respective wedge 37 may be 20placed in the channel bounded by the web 13 and the lip 19 of each form member 11 such that the inclined surface of the wedge faces the adjacent end of the form member 12. The wedge 37 may then be driven in the general direction of the form member 12, as indicated by arrow 70, such that the 25inclined surface engages wall 31, whereby the upper edge of the web 29 and the upper wall 30 are forced to abut the upper wall 14, and the lateral abutment is forced between the lips 19 and 35 so as to urge the webs 13 and 29 together.

To further maintain the lateral engagement of the two 30form members a tapered wedge 36 may be inserted in the slotted aperture 38 such that the orthogonal edge 40 bears against the lip 34 of the form member 12 forcing the surface 32 thereof to abut the web 13 of the thin walled frame member.

35 Alternatively, a plurality of levers 75 may be used to operatively clamp abutting form members 11 and 12 together.

For example, the end portion of the lever 75 may be placed below the wall 31 such that a portion of the lever intermediate its ends rests upon the edge 79 and whereupon a downwardly directed force may be applied to the handle so as to force the upper wall 30 against the upper wall 14.

In order to maintain the force applied by the lever to the further form member 12, the handle of the lever 75 may be located within one of the notches 84 of a bracing member 80, previously used to prop the further form member 12 in an operative position against the thin walled form member 11 as illustrated in figure 6, or which is used to lateral support for a thin walled form member as illustrated in figure 8.

In order to provide support for the form members 12, a plurality of pegs 42, each located in a respective tubular member 43 may also be driven into the ground and whereby additional bracing members 22 or 80 may be used to support each form member if required.

Where there exists a corner, a connecting member 60 may be used to connected two adjacent inclined form members 12 as per the method of engagement described above.

In order to disassemble the boxing, such as may be required once the concrete has set, the pegs 21, 28 and 42 may be withdrawn and the wedges 36 and 37, or levers 75, removed.

It will be appreciated that the form members may be coated with a lubricant in order to inhibit concrete adhering to the form surfaces.

It will also be appreciated that the upper edge of each web 13 and 33 and/or the upper walls 14 and 30 each provide levelling means which may be used to support a trowel.

Furthermore, arcuate or flexible form members generally of the type described herein may be used to construct an arcuate continuous wall for supporting wet concrete or the like.

Figures 10 to 16 illustrate yet another method of operatively urging together a thin walled form member 11 and a further form member 12 using a specially configured

connecting member 100 manufactured from a piece of sheet metal. The connecting member 100 is substantially rectangular in shape and includes an upper edge 101 and a lower edge 102.

The edges 101 and 102 each include respective mounting portions adapted to engage portions of the form members 11 and 12 including respective pairs of vertically orientated slots 103 and 104, and 105 and 106. The slots 103, 104, 105 and 106 are adapted to receive therein the respective lipped edges 34, 18, 35 and 19 of the form members 11 and 12 and wherein the slots 103 and 104, and the slots 105 and 106, are spaced apart a distance equivalent to that separating lipped edges 34 and 18, and lipped edges 35 and 19, respectively when the form members are operatively assembled.

With reference to figures 10 to 16 there is also provided securing means for securing the connecting member 100 to a peg 28, the securing means being adjustable in both the lateral and vertical directions. The securing means includes a connecting member 110 having a hook like end portion 111 which is adapted to engage an intermediate portion of the peg 28 anywhere along it's length. The connecting member 110 also includes a threaded stem 112 which extends slidably through a slotted aperture 113 formed in the clamping member 100 and is secured thereto by a threaded nut 114.

To prevent or resist rotation of the connecting member 100 relative to the peg 28 in the direction generally indicated by arrows 115, the connecting member is provided with flanges 116, the edges of which frictionally engage or bite into the peg due to the application of the nut 114.

The connecting member 100 is also provided with flanges 117 which abut against the internal surface 33 of the form member 12 and thereby resist rotational movement of the form member relative to the connecting member 100 as indicated by arrows 118.

The connecting member 100 is also provided with a rear flange 119 which a user may strike with a hammer or the like

in order to adjust the position of the form member relative to the peg 28.

In use, the form members 11 and 12 may be laid out on the foundation such that the form members 12 are each slidably received within a respective form member 11 and wherein the arrangement of form members generally defines the boundaries of the proposed concrete element.

Having completed the layout of form members, a plurality of inclined connecting members 100 may each be positioned relative to the form members 11 and 12, as illustrated in figure 10 such that the lipped edges 35 and 19 are located within slotted recesses 105 and 106 respectively. The form members 11 and 12 may then be operatively urged together by rotating the inclined connecting member 100 until it is substantially vertical whereupon the lipped edges 34 and 18 will be located within the slotted recesses 103 and 104 respectively and the form surfaces will be maintained in an abutting relationship supported by abutting flanges 117.

The connecting members may each be connected to an adjacent upstanding peg using the connection means described and wherein the lateral position of each connecting member relative to an associated peg 28 may be adjusted by sliding the stem 112 laterally along the slot 113. Similarly the height of each connecting member above the ground may be adjusted by sliding the hook like end portion 111 along the length of the associated peg 28 in a vertical direction.

To disengage the form members for stripping purposes, the connecting members are disconnected from the supporting pegs and are each rotated towards an inclined or substantially horizontal attitude.

It will be appreciated that the connecting members 100 described herein could also be used to support timber form members and wherein the timber form members may be attached to the flanges 117 using fasteners such as bolts.

Figures 18 to 20 illustrate a small section of an adjustable boxing assembly 210 for particular use in the construction of

slab like concrete foundations having a rebated or stepped side face. The boxing assembly 210 comprises a lower boxing assembly 211 and an upper, adjustable, boxing assembly 212.

The lower boxing assembly 211 consists of a plurality of 5 timber form members 213 arranged end to end such that the outer faces 214 of each member 213 form a substantially continuous side wall for supporting wet concrete or cement. However, in other embodiments, the lower boxing assembly may comprise a plurality of adjustable, thin walled, form members of 10 the type described in Australian Patent application No. 72963/94.

The upper boxing assembly 212 includes two thin walled form members 215 and 216. The thin walled form member 215 is dimensionally slightly larger than the form member 216 and 15 includes an outer face 217, which constitutes a form surface against which wet concrete or cement may be placed.

The thin walled form member 216 also includes an outer face 218 or form surface, against which wet concrete or cement may be placed, said outer face 218 being engageable 20 behind said outer face 217 as illustrated in figures 18 and 19.

Together, the outer faces 217 and 218 combine to form a substantially planar form surface.

The upper boxing assembly 212 is spaced both upwardly and forwardly from the lower boxing assembly 211 by a 25 plurality of positioning means 220 positioned at various intervals along the length of the boxing assemblies 211 and 212.

The positioning means 220 includes spacing means 221, comprising an "L" shaped piece of tubular steel 222, separating 30 locating means 223 and support means 224.

The locating means 223 is channel shaped and includes a pair of substantially parallel form engaging surfaces 225 separated by an intermediate portion 226. The locating means is adapted to frictionally engage an upper portion of the lower 35 boxing assembly 211 as illustrated in figures 18 to 20.

The support means 224 is adapted to provide support for

the upper boxing assembly 212 and includes a horizontally disposed, rearwardly directed, flange or abutment 227 and a vertically orientated, forwardly disposed, flange 228.

The positioning means 220 also includes retaining means 5230 for retaining the upper boxing assembly 212 in an operative configuration. The retaining means 230 includes a hook like member 231 which is secured to the spacing means 221 and which is capable of movement in a generally vertical direction as indicated by arrow 232 and rotational movement about an axis 233.

Figures 21 to 24 illustrate a similar adjustable boxing assembly 300 to that illustrated in figures 18 to 20. The boxing assembly 300 comprises an adjustable lower boxing assembly 311 and an adjustable upper boxing assembly 312.

15 The lower boxing assembly 311 includes a thin walled form member 11 and a further form member 12 and wherein the two form members are retained in an operatively engaged configuration by a connecting member 100' which, apart from its elongate securing means (rear portion), is substantially 20 identical to the connecting member 100 illustrated in figures 10 to 16.

The upper boxing assembly 312 includes two thin walled form members 215 and 216 and is spaced both upwardly and forwardly from the lower boxing assembly 311 by a plurality of 25 positioning means 220' spaced at intervals along the length of the lower boxing assembly. The positioning means 220' is quite similar to the positioning means 220, with the exception that the locating means 323 which includes a horizontally disposed end portion 324 as opposed to aforescribed channel shaped 30 end portion. The end portion 324 is slidably received within a sleeve 326 mounted on an upper flange 116' of the connecting member 100' and is secured thereto using a grub screw 325.

In use, a plurality of timber form members 213 may be arranged end to end so as to define the outer most boundaries 35 of a lower boxing assembly intended to enclose wet concrete or cement. Alternatively, the lower boxing assembly 311 may be

constructed in a similar manner to that described in relation to the boxing assembly illustrated in figures 10 to 16.

In order to support the intended upper boxing assembly 212 or 312 in a forward position relative to the lower boxing assembly 211 or 311, a plurality of positioning means 220 or 220' are mounted at spaced intervals along the length of the lower boxing assembly in the manner illustrated in figures 18 and 23 respectively.

The upper boxing assembly is constructed by supporting a plurality of thin walled form members 216 each on a plurality of positioning means 220 or 220' such that the horizontally disposed upper wall 235 of each form member rests on a plurality of flanges 227. Preferably, the thin walled form members are spaced laterally apart and may be temporarily restrained from falling off the supporting positioning means by the selective positioning of the restraining means 230 as shown in figure 18.

Adjacent thin walled form members 216 are preferably interconnected by respective thin walled form members 215, i.e. the end portions of each thin walled form member 215 overlie the end portions of the adjacent thin walled form members 216. The form member 215 is preferably lifted into place by firstly positioning the upturned rear edge 236 behind the upturned rear edge 237 of the form members 216 and subsequently rotating the form member 215 in the direction of arrow 238.

The assembled form members 215 and 216 are preferably retained in place by the selective engagement of the retaining means 230 as shown in figure 18.

In use, the outer faces 217 and 218 combine to form a substantially planar form surface against which wet concrete 240 may be placed and wherein it is believed that the flanges 228 resist rotation of the form members 215 and 216 in the direction of arrow 239 due to lateral forces exerted thereon by the concrete.

It will be appreciated that a trowel may be used to level the upper surfaces 241 of the concrete 240 between the

rearward lower edges of the upper boxing assembly and the upper edges of the lower boxing assembly. It will also be appreciated that the upturned rear edges 236 and 237 in use prevent substantial quantities of concrete from flowing between the adjacent form members 215 and 216 and subsequently cementing said form members together.

Once the concrete has set, the upper boxing assembly 212 and the positioning means 220 or 220' may be separated from the lower boxing assembly.

10 In order to strip the form members 215 and 216, the restraining means 230 may be lifted upwardly and rotated rearwardly away such that the distal end thereof no longer prevents the forward displacement of the form members 215 and 216. This will allow the user to remove the overlying form 15 members 215 by tilting said members forward and lifting their lower portions clear of the lower portions of the form members 216.

It will of course be realised that while the above has been given by way of illustrative example of this invention, all 20 such and other modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An adjustable boxing assembly including:-
a thin walled form member having an outer face which constitutes a form surface against which concrete may be placed;
a further form member having an outer form surface against which concrete may be placed and being engageable behind said outer face, and
engaging means for engaging said further form member and said thin walled form member in an operative attitude.
2. An adjustable boxing assembly as claimed in Claim 1, wherein said thin walled form member includes an inner face and wherein said further form member is engageable against said inner face such that said engaged form members provide a substantially contiguous form surface.
3. An adjustable boxing assembly as claimed in Claim 1 or Claim 2, wherein said thin walled form member includes lateral and vertical restraining means disposed rearward of said form surface and wherein there is provided significant clearance in both the lateral and vertical directions between said lateral and vertical restraining means and said further form member.
4. An adjustable boxing assembly as claimed in any one of the preceding claims, wherein said engaging means includes a connecting member for connecting both of said form members together.
5. An adjustable boxing assembly as claimed in claim 4, wherein said connecting member is adapted to engage both said thin walled form member and said further form member by rotating said connecting member to its connecting position.
6. An adjustable boxing assembly as claimed in any one of

the preceding claims, wherein said boxing assembly includes foundation engaging means.

7. An adjustable boxing assembly as claimed in Claim 6, wherein the position of said form surfaces relative to said foundation engaging means is adjustable.

8. An adjustable boxing assembly as claimed in claim 1 or claim 2, wherein said adjustable boxing assembly constitutes an upper form assembly which is spaced laterally from a lower form member and wherein there is provided positioning means for maintaining said adjustable boxing assembly in a desired spaced relationship relative to said lower form member.

9. An adjustable boxing assembly as claimed in claim 8, wherein said positioning means includes:

supporting means for supporting said adjustable boxing assembly;

spacing means for spacing said adjustable boxing assembly laterally from said lower form member, and

locating means for locating said spacing means in a selected position relative to the lower form member.

10. A method of erecting an adjustable boxing assembly including:

providing a thin walled form member having an outer face against which concrete may be placed;

positioning a portion of a second form member, being a form member having an outer form surface against which concrete may be placed, behind said outer face of said thin walled form member, and

urging said further form member and said thin walled form member together such that said outer face and said outer form surface form a substantially contiguous form surface.

11. A method of erecting an adjustable boxing assembly as claimed in claim 10 and providing engaging means for urging said outer form surface against said inner face, and
urging said outer form surface against said inner face so as to provide a substantially contiguous form surface.

12. A method of constructing a concrete element, said method including:

constructing a boundary against which the concrete may be cast using a boxing assembly as claimed in any one of claims 1 to 9;

pouring concrete against said boxing assembly, and
subsequently removing said boxing assembly.

13. Positioning means for maintaining an upper form member in a desired spaced relationship relative to a lower form member including:

spacing means;

locating means for locating said spacing means in a fixed position relative to the lower form member, and

supporting means connected to said spacing means for supporting the upper form member.

14. Positioning means as claimed in claim 13 wherein the configuration of said supporting means is such that the upper form member rests upon said support means and wherein there is also provided selectively engageable retaining means for retaining the upper form member in operative engagement with said support means.

15. Positioning means as claimed in Claim 13 or Claim 14, wherein said locating means is adapted to engage the lower form member.

16. Positioning means as claimed in Claim 13 or Claim 14, wherein said locating means is adapted to engage engaging

means used to connect the lower form member to an adjacent lower form member.

17. A form member support assembly for operatively supporting a form member, said form member support assembly including:

foundation engaging means, and
mounting means for mounting a form member thereto.

18. A form member support assembly as claimed in Claim 17, wherein the position of said mounting means relative to said foundation engaging means is adjustable.

19. An adjustable boxing assembly including:-

a lower form member;

an upper boxing assembly comprising at least two form members, the position of said form members relative to one another being adjustable, and

positioning means for maintaining said upper boxing assembly in a desired spaced relationship relative to said lower form member.

20. An adjustable boxing assembly substantially as hereinbefore described with reference to the accompanying drawings.

21. Positioning means for maintaining an upper form member in a desired spaced relationship relative to a lower form member substantially as hereinbefore described with reference to the accompanying drawings.

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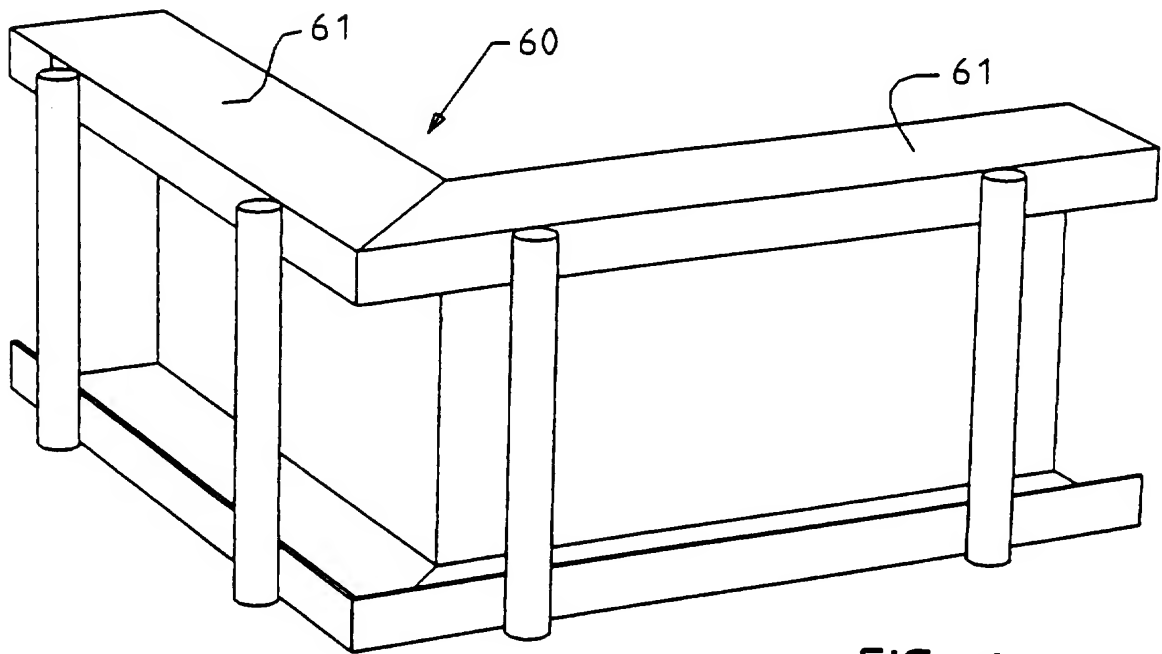


FIG. 4

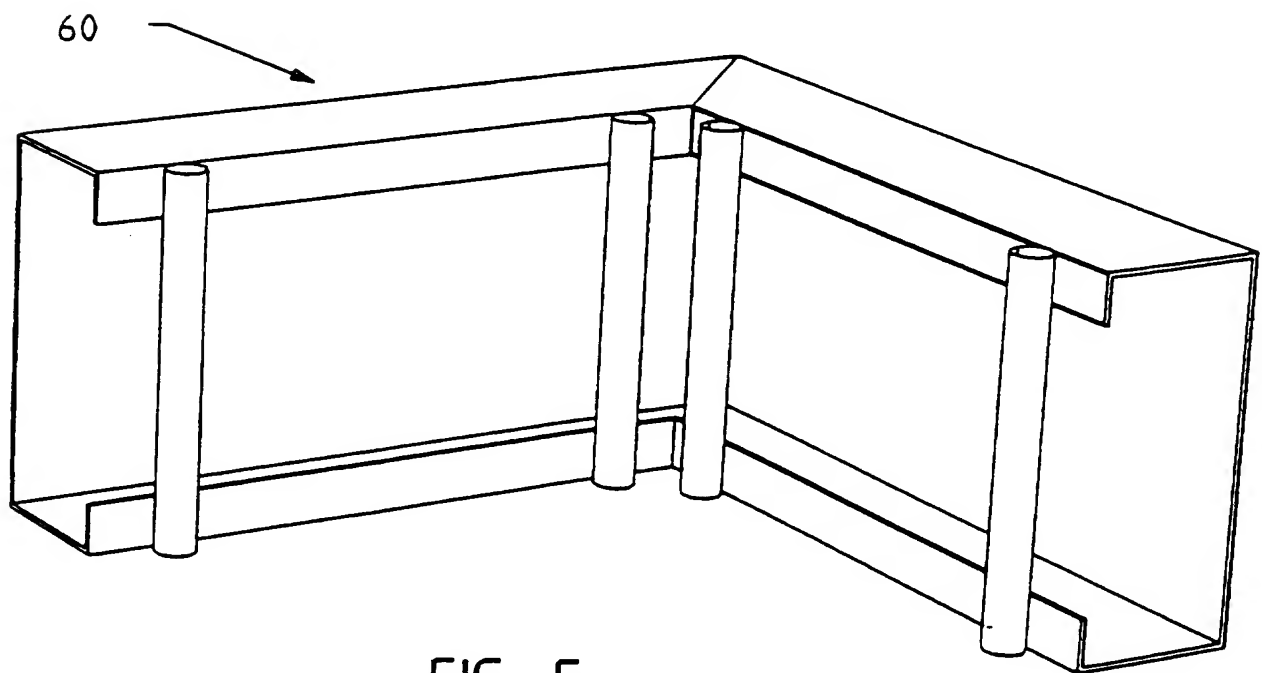
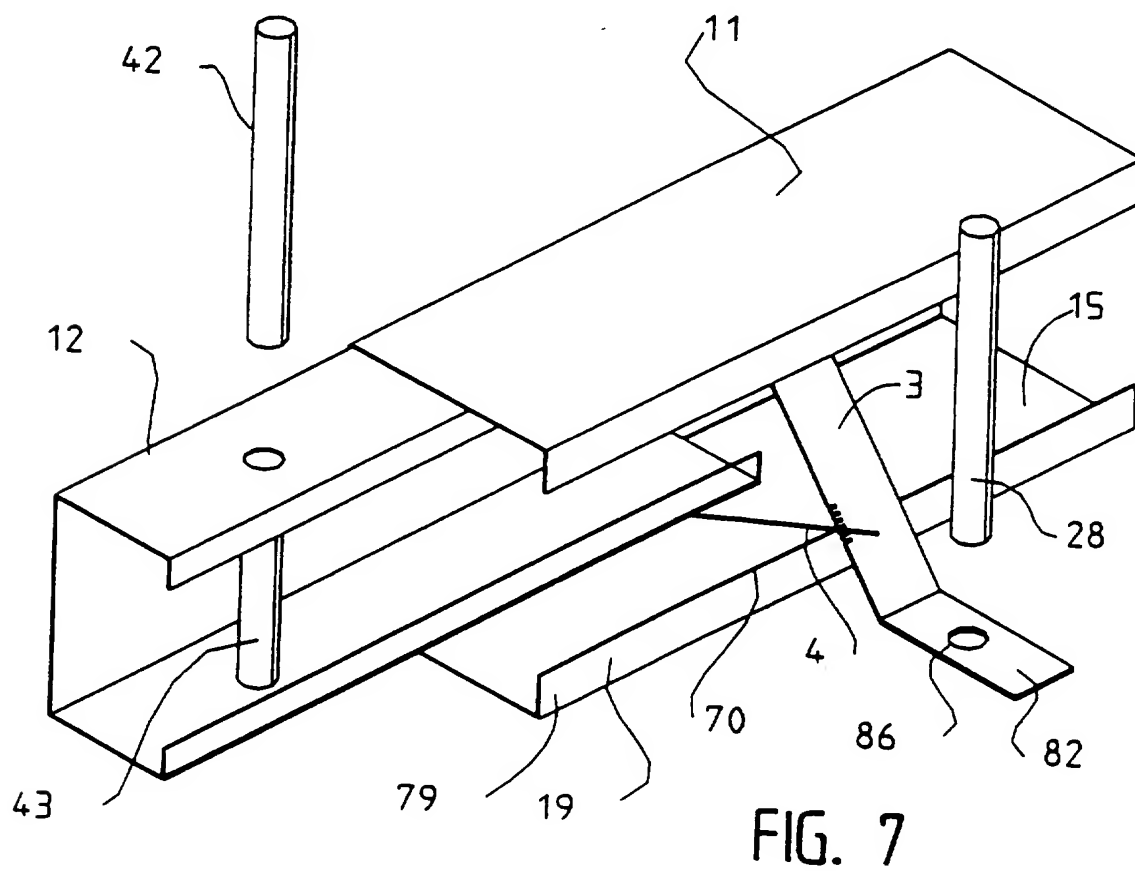
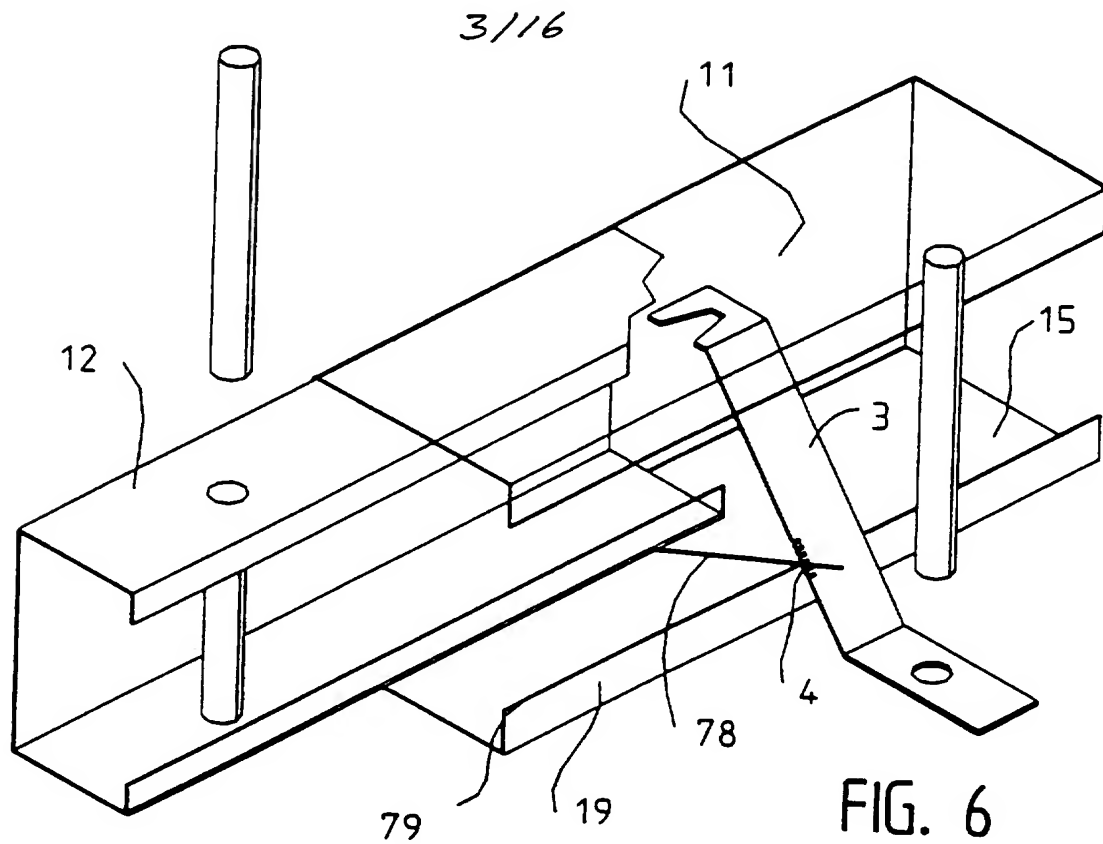
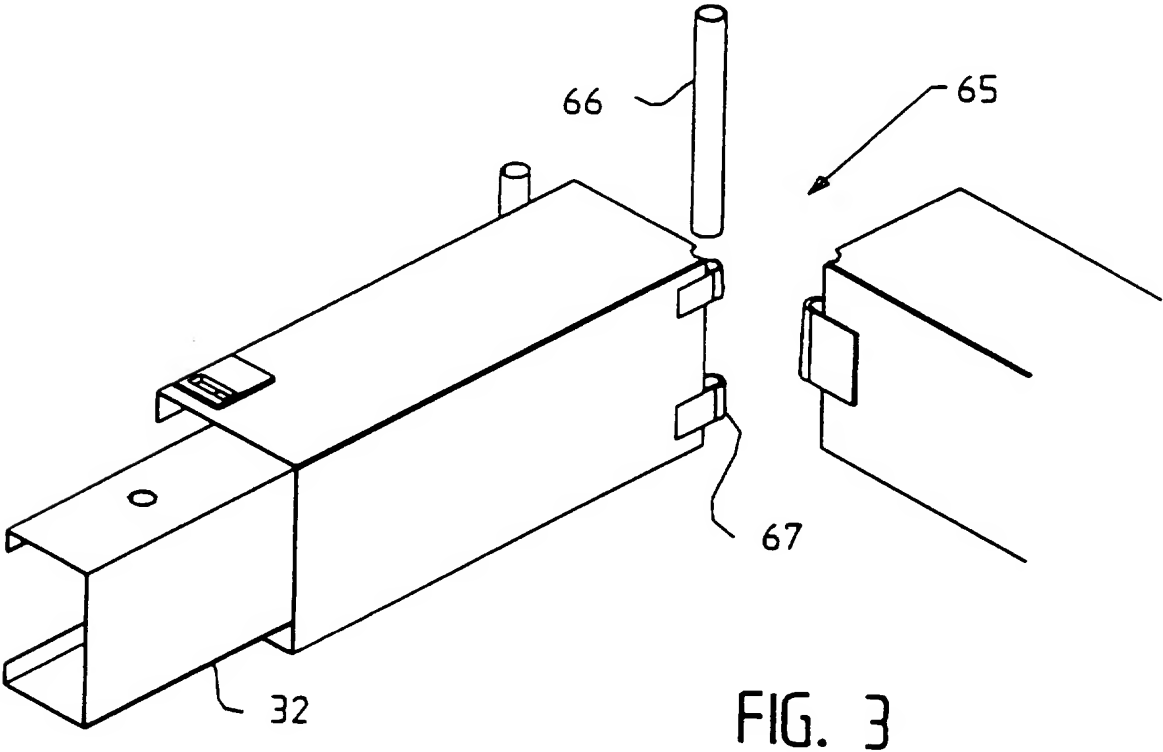
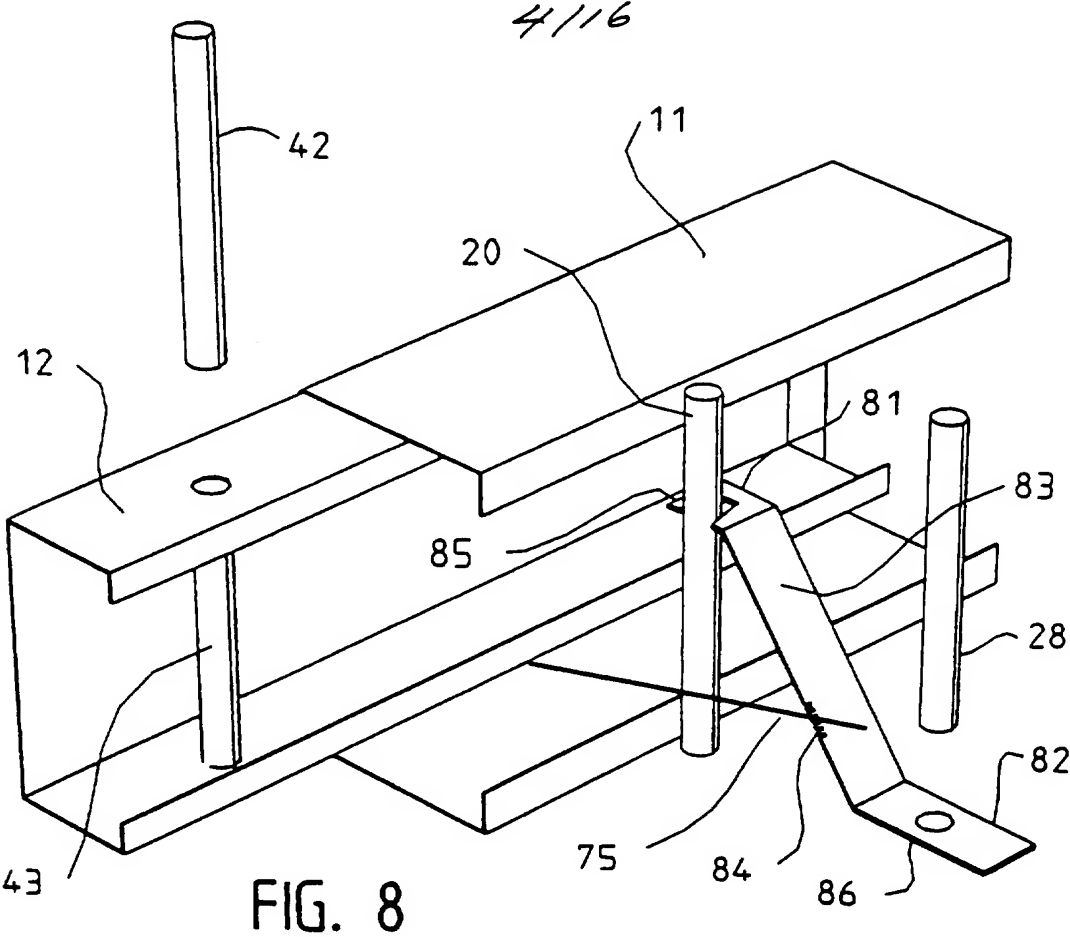
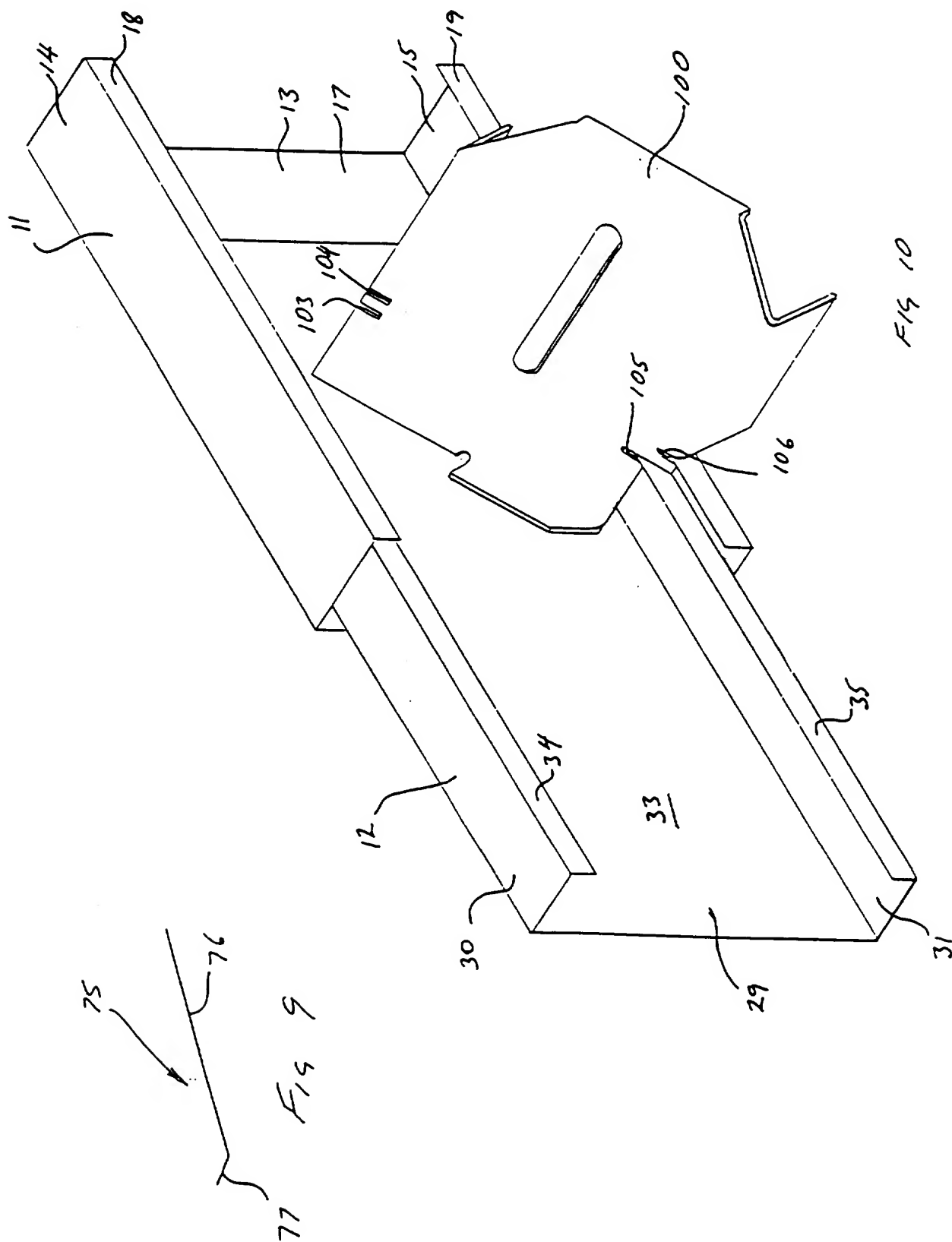


FIG. 5

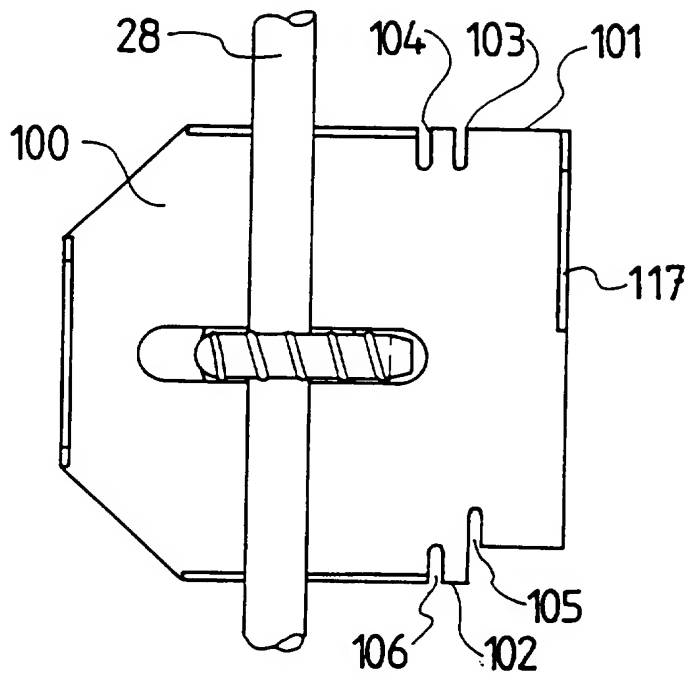
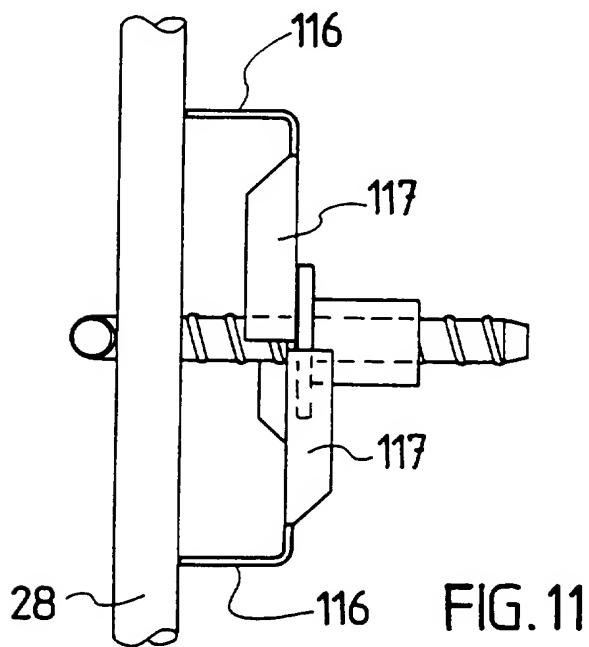


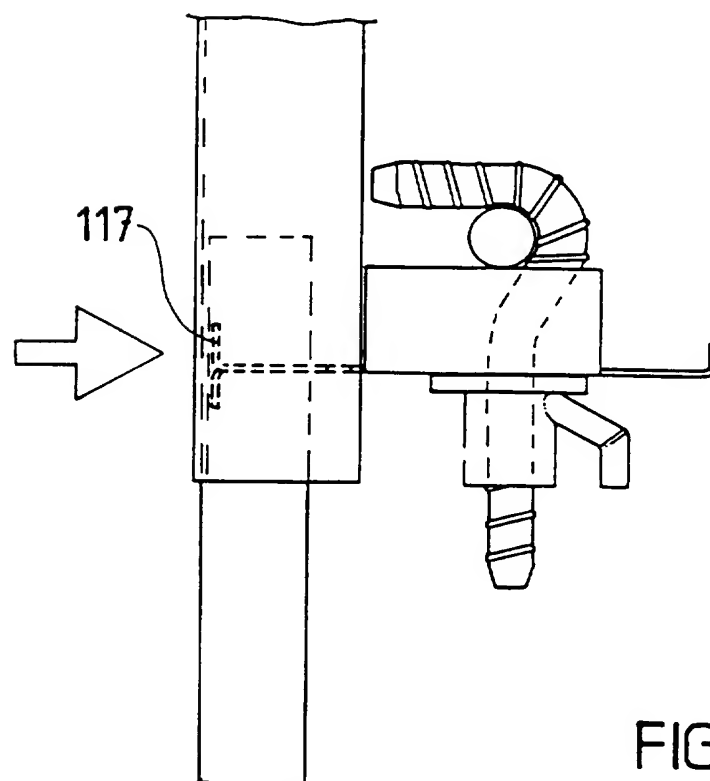
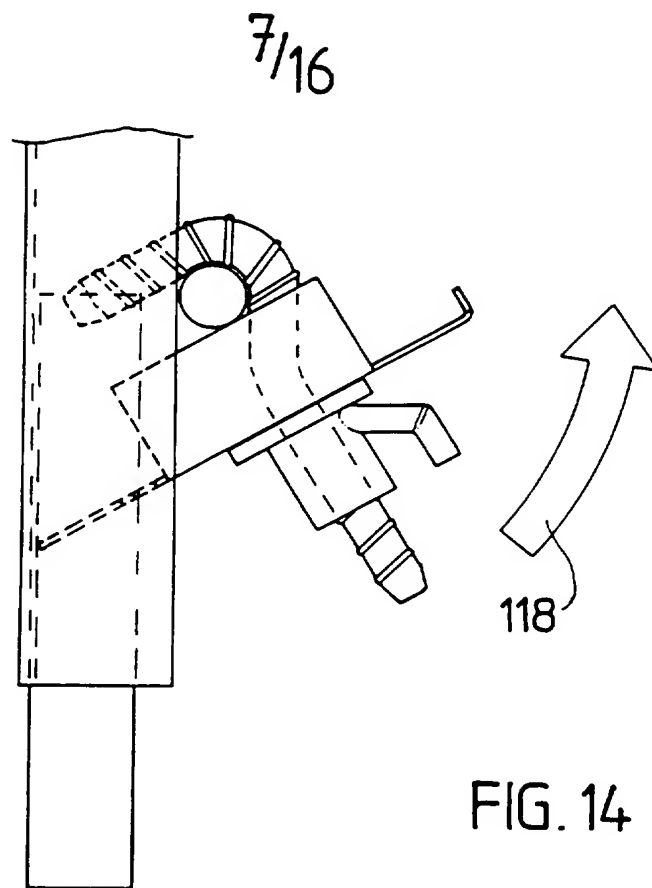


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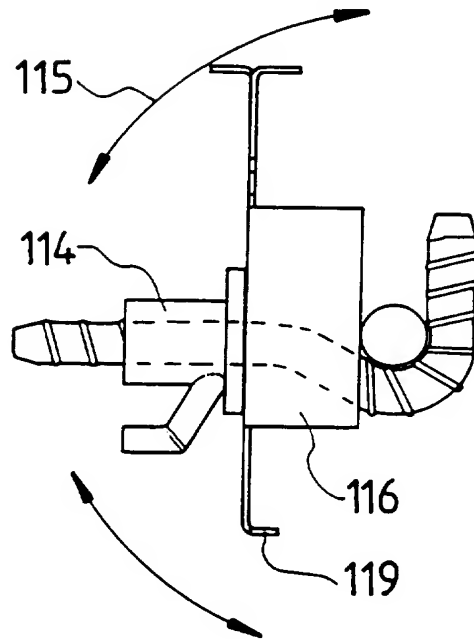


FIG. 13

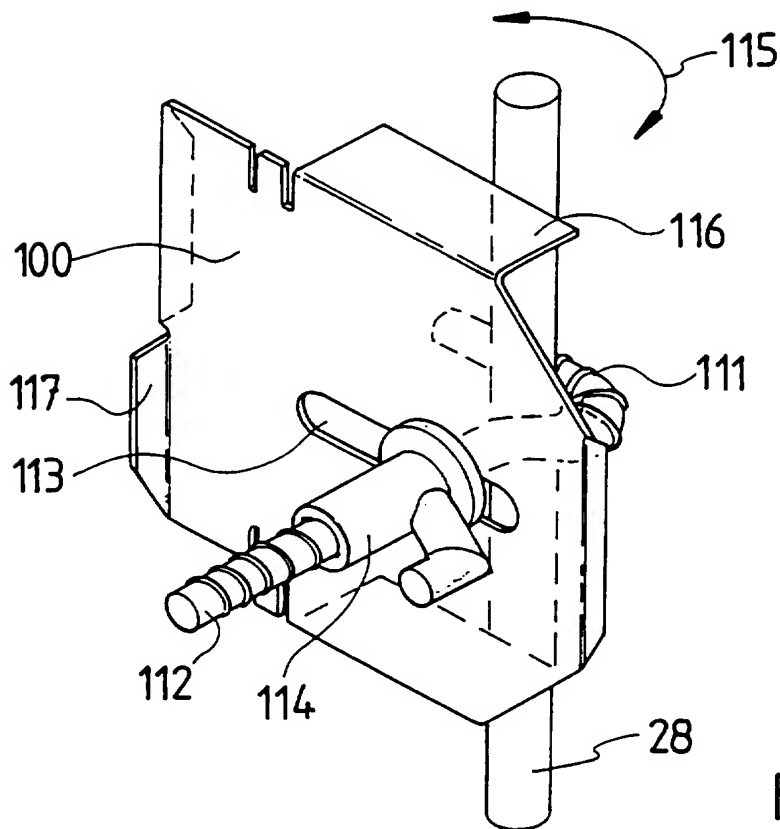


FIG. 16

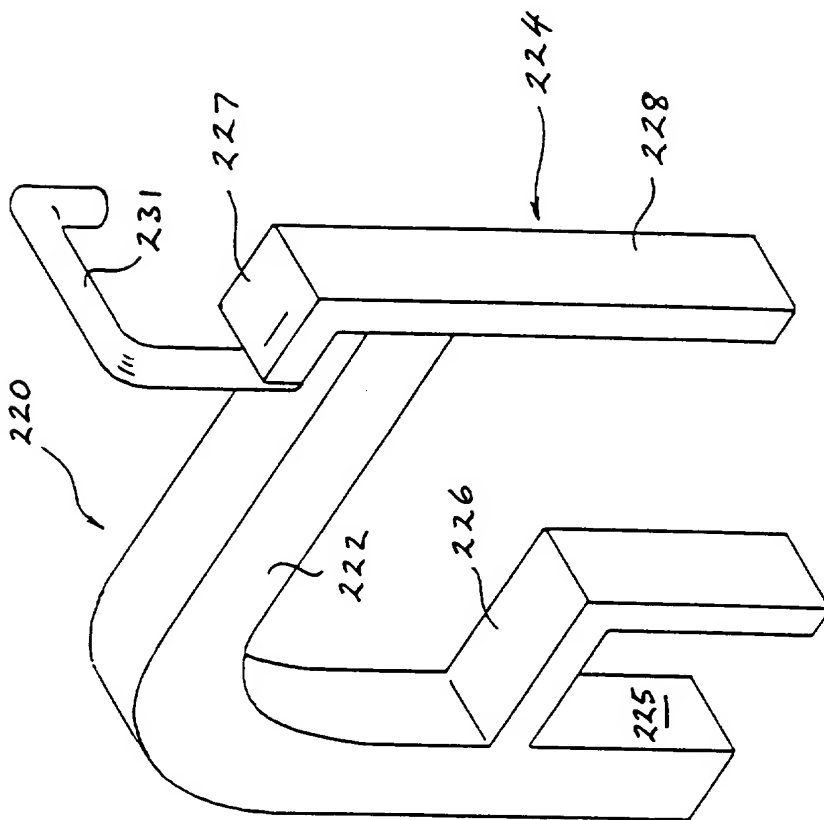
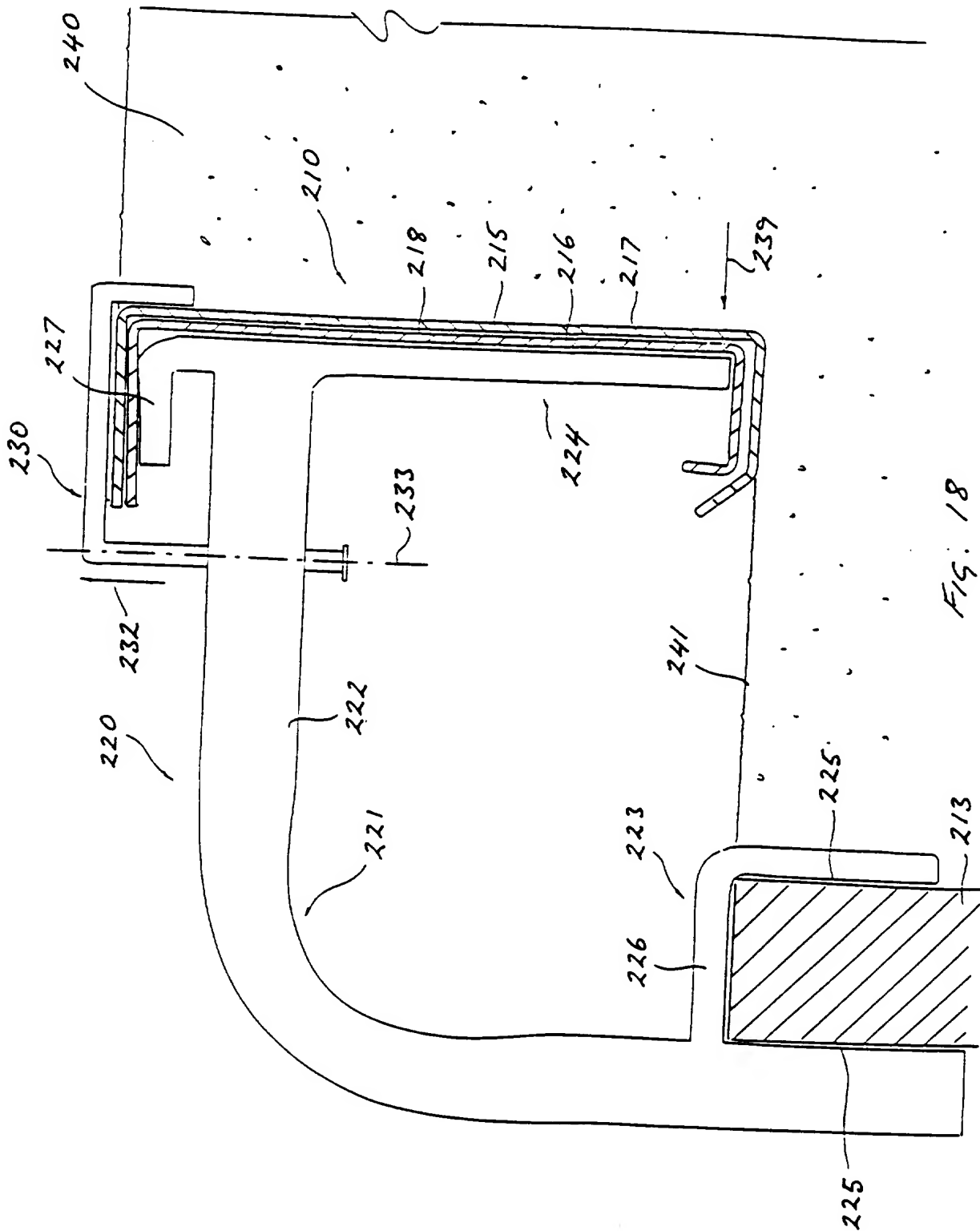
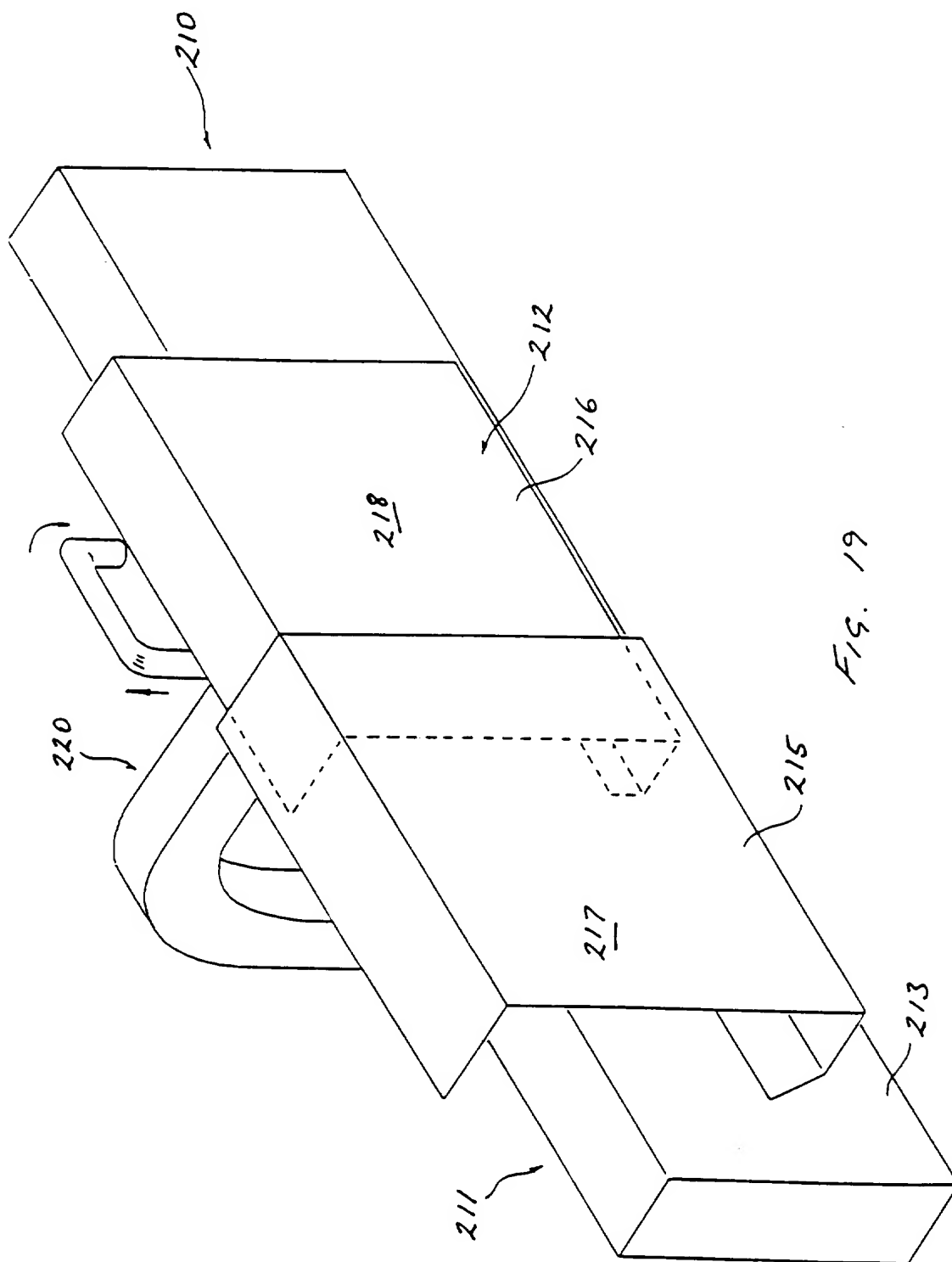


FIG. 17

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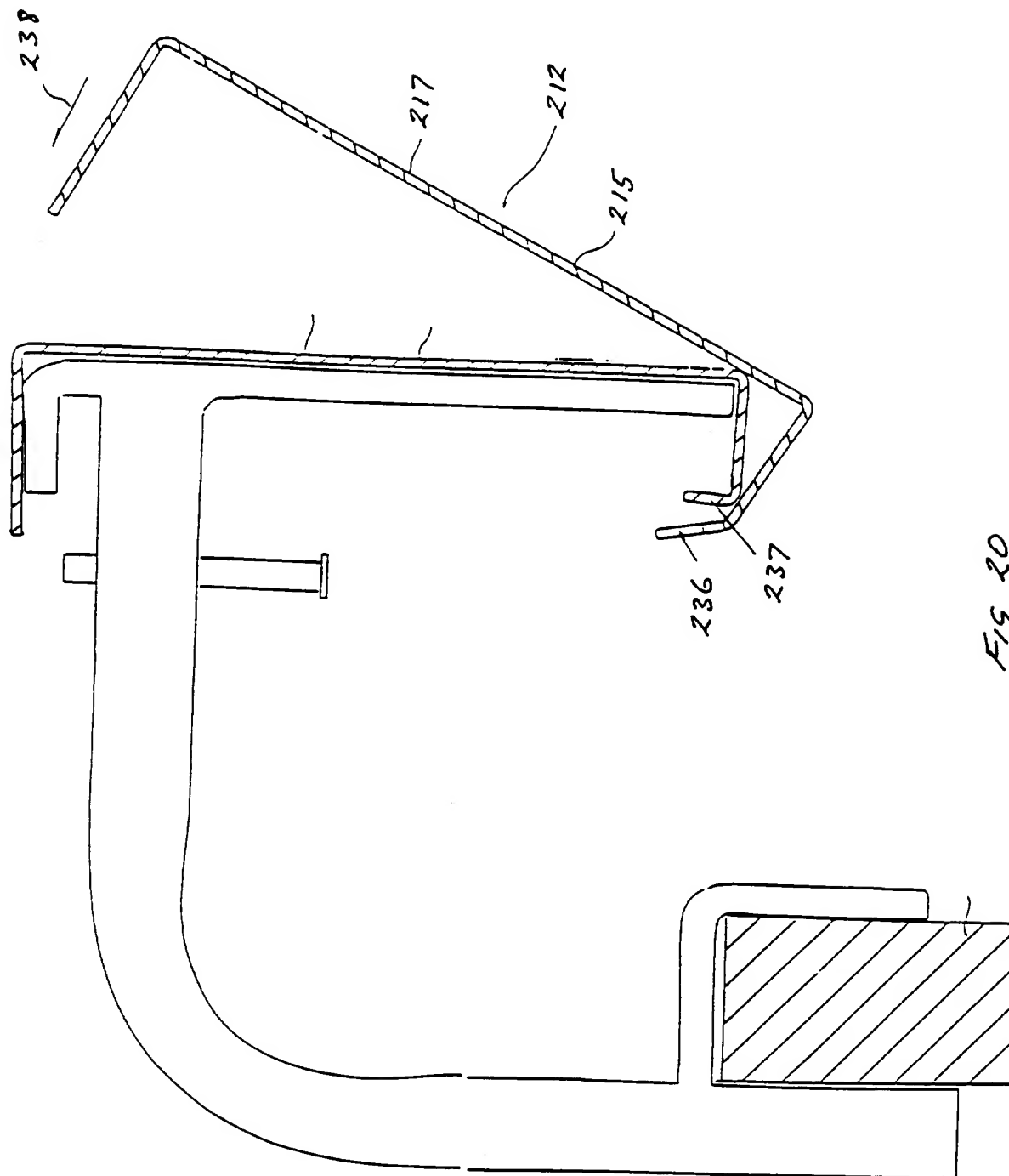


Fig 20

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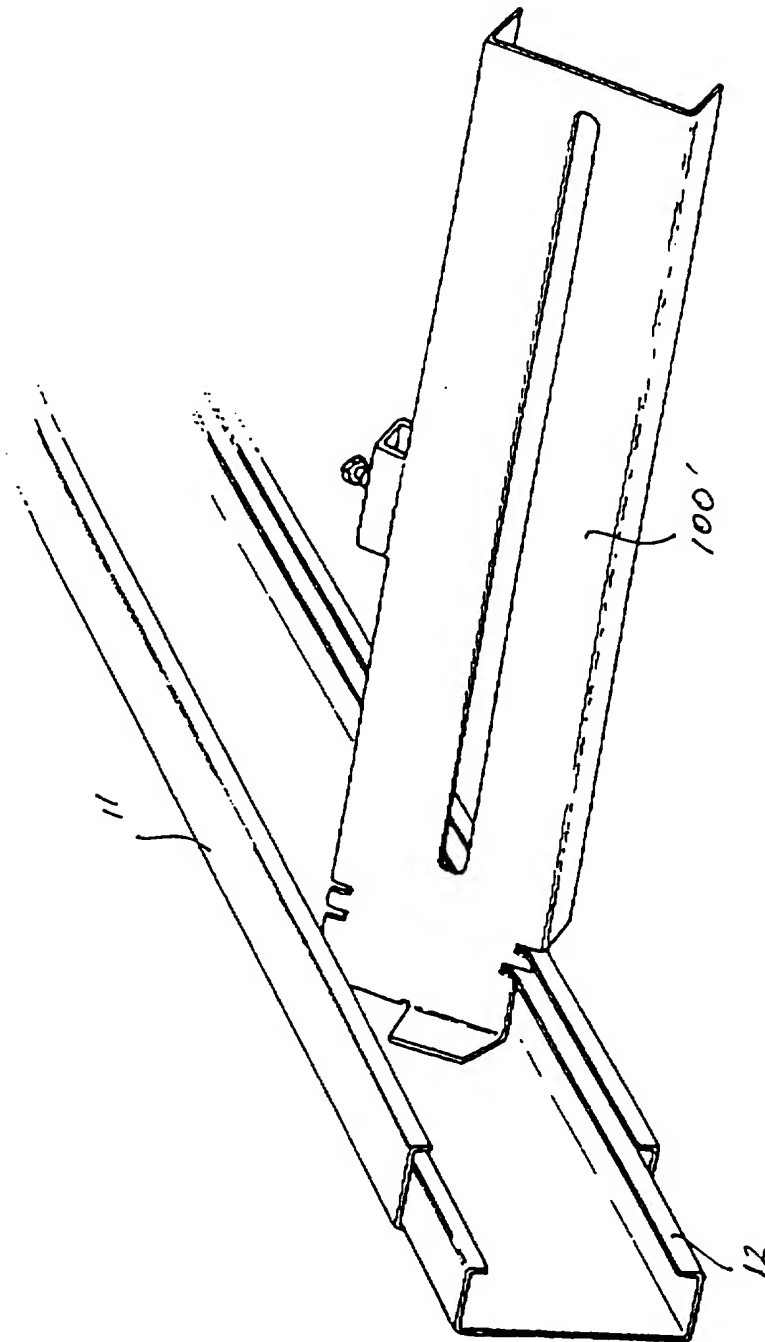


FIG 21.

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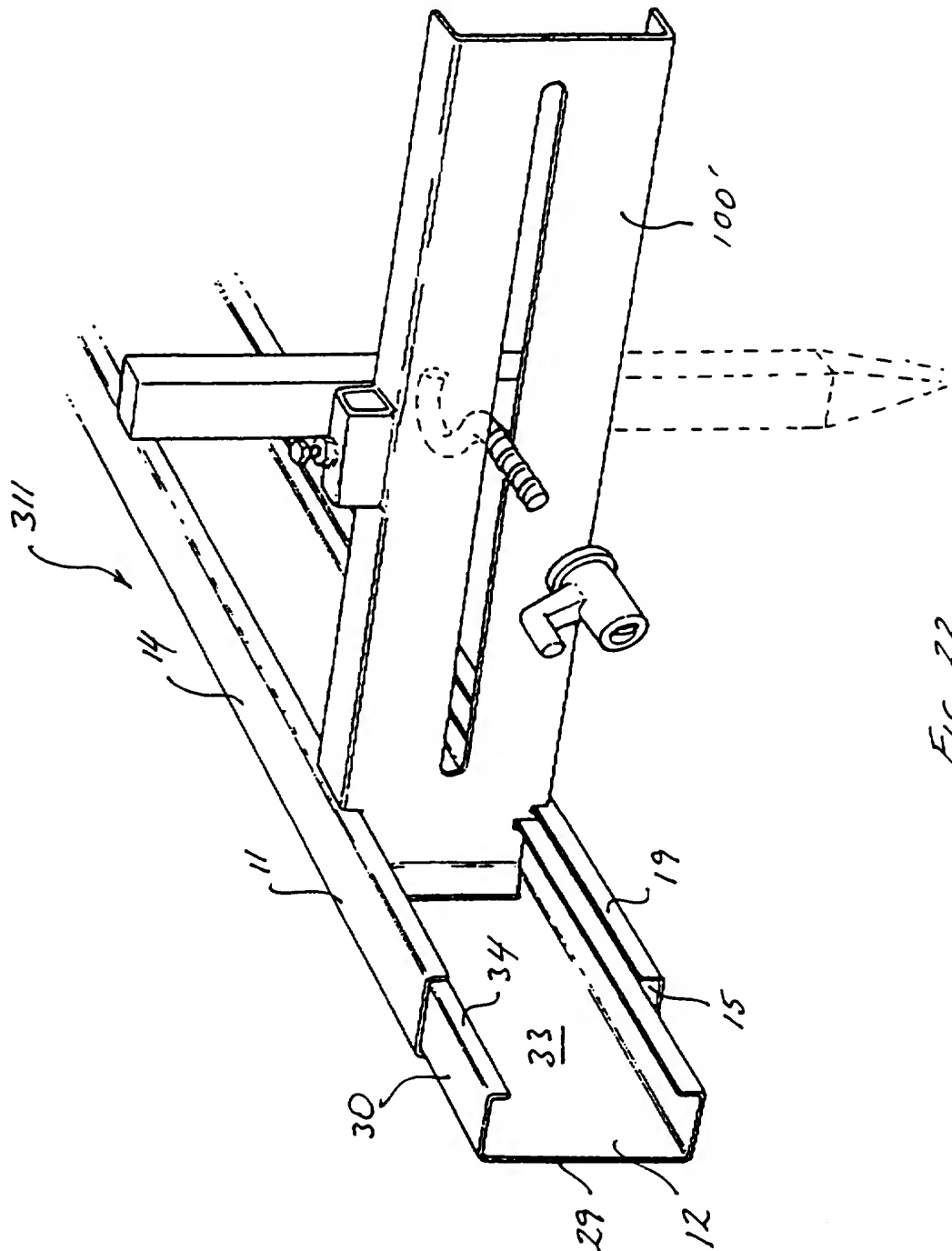
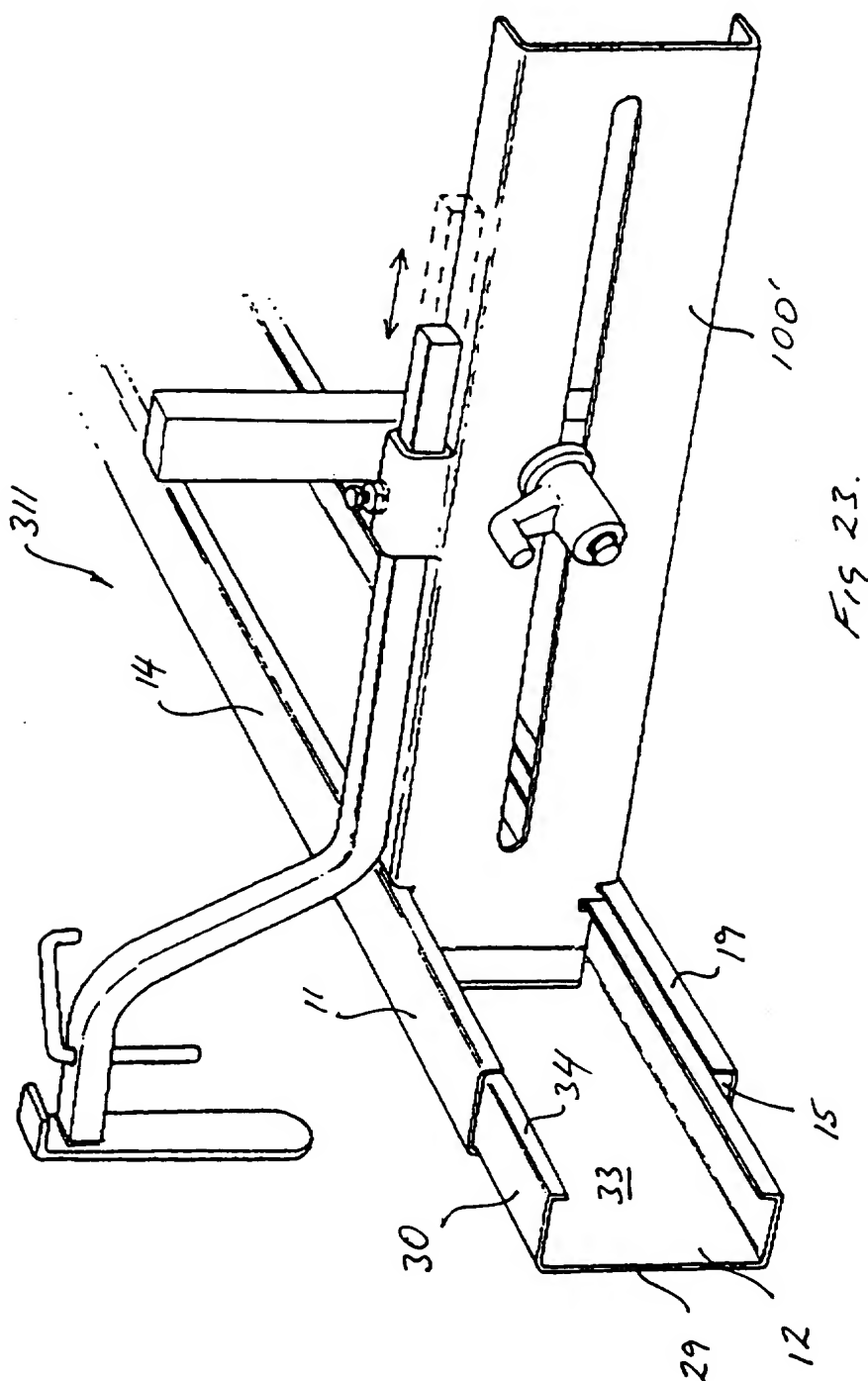


Fig 22

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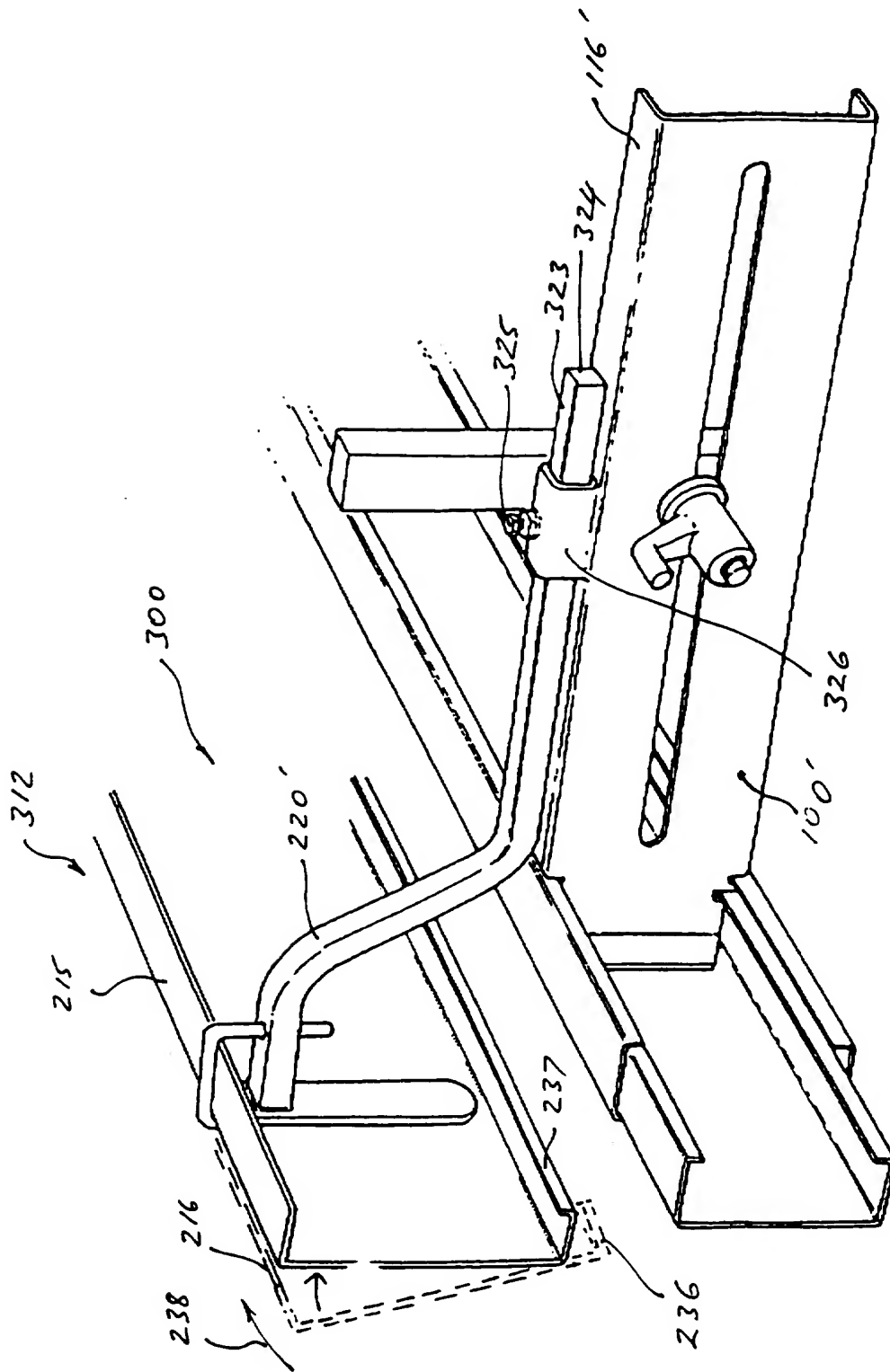


FIG 24

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 95/00516

A. CLASSIFICATION OF SUBJECT MATTERInt Cl⁶: E04G 9/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC : E04G 9/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU : IPC as above, E04G 17/-Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DERWENT : adjustable or telescopic or variable**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	AU 52379/93 (654647) B (PRATT) 10 November 1994 page 10 line 13 - page 12 line 13	1-4, 6, 10-12
X	AU 36701/93 A (BEBEK) 14 October 1993 page 6 lines 27-32, claim 11	1, 2, 4, 6, 7, 10-12
X	AU 3118/26 A (SCAFFOLDING (GB) LTD) 21 December 1926 Figures 1 and 7	1, 2, 4, 10-12

☒ Further documents are listed in the continuation of Box C☐ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

22 November 1995

Date of mailing of the international search report

28 NOVEMBER 1995

Name and mailing address of the ISA/AU
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INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 95/00516

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 10413/22 A (CHRISTIE et al) 8 January 1924 column 7 lines 15-27, Figure 12	1, 2, 4, 6, 7, 10-12
X	Patent Abstracts of Japan, M-1647, page 24, JP,A, 6-117089 (MITSUBISHI MATERIALS CORP) 26 April 1994	1, 2, 4-6, 10-12
X	DE 1952963 A (LORENZ) 29 April 1971 See Figure	1, 2, 4, 6, 10-12

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 95/00516

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-12
Adjustable boxing assembly
2. Claims 13-16 and 21
Means positioning an upper form member relative to a lower form member
3. Claims 17-18
A form member support assembly
4. Claims 19, 20
Adjustable boxing assembly

as reasoned on the extra sheet:

- ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
- ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
- ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
- ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Box II continued

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching authority has found that there are four inventions:

1. Claims 1-12 directed to an adjustable boxing assembly comprising two form members one of which may be engaged behind the other to give boxing of adjustable length. The length being adjustable is considered to comprise a first "special technical feature".
2. Claims 13-16 and 21 directed to positioning means for positioning an upper form member relative to a lower form member. Positioning the two forms relative to each other is considered to be a second "special technical feature".
3. Claims 17-18 directed to a form member support assembly that uses foundation engaging means. These means are considered to co comprise a third "special technical feature".
4. Claims 19, 20 directed to an adjustable upper boxing assembly and a lower form member, with positioning means maintaining the two in a spaced relationship. The positioning means are considered to comprise a fourth "special technical feature".

Since the above-mentioned groups of claims do not share the technical features identified, a "technical relationship" between the inventions, as defined in PCT Rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

PUB-NO: WO009605388A1
DOCUMENT-IDENTIFIER: WO 9605388 A1
TITLE: AN ADJUSTABLE BOXING ASSEMBLY
PUBN-DATE: February 22, 1996

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APPL-NO: AU09500516
APPL-DATE: August 17, 1995

PRIORITY-DATA: AUPM752294A (August 16, 1994)

INT-CL (IPC): E04G009/02

EUR-CL (EPC): E01C019/50 , E01C019/50 , E04G011/36 ,
E04G013/00 , E04G017/04 , E04G017/04

ABSTRACT:

An adjustable boxing assembly including a thin-walled form member (11), having an outer face (16), of web (13), which constitutes a form surface against which concrete may be placed, and a further form member (12), having an outer form surface (32), of web (29), against which concrete may be placed, the outer form surface (32) being engageable behind the web (13) and maintained in such an operable attitude by clamping means (100) such that the two form surfaces are substantially co-extensive.